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10/541,382	07/01/2005	Motohisa Kamijo	040356-0565	6333
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FOLEY AND LARDNER LLP			TRAN, BINH Q	
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WASHINGTON, DC 20007			3748	

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Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Receipt and entry of Applicant's Preliminary Amendment dated July 01, 2005 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 4-9, and 11 are rejected under 35 U.S.C. 102 (b) as being anticipated by Abe (Patent Number 6,991,663).

Regarding claim 1, Abe discloses a fuel vaporizing device (4) which supplies fuel vapor containing hydrocarbon to a fuel reformer (1) which produces reformat gas having hydrogen as a main component from the fuel vapor by means of a catalytic reaction, comprising: a fuel vaporizer (4); a fuel injector (e.g. 21, 27A, 28A) which supplies fuel into the fuel vaporizer (4); an air injector (e.g. 8, 12) which supplies air into the fuel vaporizer (4) to produce an air-fuel mixture in the fuel vaporizer (4), an air supply amount of the air injector (e.g. 8, 12) being controlled in relation to a fuel supply amount of the fuel injector (e.g. 21, 27A, 28A) so as to obtain an excess air factor of the air-fuel mixture corresponding to a predetermined rich air-fuel ratio; and a glow plug (9) which partially oxidizes the air-fuel mixture produced inside the fuel vaporizer (4) (e.g. See Fig. 3; col. 5, lines 50-67; col. 6, lines 1-67; col. 7, lines 1-51).

Regarding claim 4, Abe further discloses that the fuel vaporizing device further comprises a member (e.g. 28A, 12, 3) which suppresses flame propagation accompanying the partial oxidation of the fuel inside the fuel vaporizer (4) (e.g. See Fig. 3; col. 5, lines 50-67; col. 6, lines 1-67; col. 7, lines 1-51).

Regarding claim 5, Abe further discloses that the fuel vaporizing device further comprises a valve (12) which supplies secondary air to the fuel vapor produced by the fuel vaporizer (4).

Regarding claim 6, Abe further discloses that the vaporizing device further comprises a heater (9) which heats the secondary air (e.g. See Fig. 3; col. 5, lines 50-67; col. 6, lines 1-67; col. 7, lines 1-51).

Regarding claim 7, Abe further discloses that the fuel vaporizing device further comprises a controller (30) programmed to control the valve (18) to stop supplying the secondary

Art Unit: 3748

air when a start-up period of the reformer (2) is complete (e.g. See col. 8, lines 31-67; col. 9, lines 1-30).

Regarding claim 8, Abe further discloses that the fuel vaporizing device further comprises a sensor (e.g. 23, 25, 26) which detects a temperature of a catalyst of the fuel reformer (1), and the controller (30) is further programmed to determine that the start-up period of the fuel reformer (1) is complete when the temperature of the catalyst exceeds a predetermined warm-up completion temperature (e.g. See cols. 6-8, lines 1-67; col. 9, lines 1-30).

Regarding claim 9, Abe further discloses that the controller (30) is further programmed to control a secondary air flow rate of the valve (18) such that the excess air factor of the fuel vapor that is supplied to the fuel reformer (1) during the start-up period of the fuel reformer (1) decreases as the temperature of the catalyst rises (e.g. See cols. 6-8, lines 1-67; col. 9, lines 1-30).

Regarding claim 11, Abe further discloses that the controller (30) is further programmed to control the fuel injector (e.g. 21, 27A, 28A) such that a fuel injection amount of the fuel injector (e.g. 21, 27A, 28A) increases as the temperature of the catalyst rises (e.g. See cols. 6-8, lines 1-67; col. 9, lines 1-30).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of design choice.

Regarding claims 2 and 10, Abe discloses all the claimed limitation as discussed above except the predetermined rich air-fuel ratio is within a range of 0.2 to 0.4, and the excess air factor of the fuel vapor that is supplied to the fuel reformer during the start-up period of the fuel reformer is set to a value within a range of 3 to 6.

Regarding the specific range of the air fuel ratio, it is the examiner's position that a range between about 0.2 to 0.4 of the predetermined rich air fuel ratio, and from 3 to 6 of the fuel vapor that is supplied to the fuel reformer during the start-up period, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as the size of the evaporator, as well as the amount of hydrogen gas, properties of materials for making the reformed catalyst, and the controlled temperature of the reformed catalytic. Moreover, there is nothing in the record which establishes that the claimed parameters present a novel or unexpected result (See *In re Kuhle*, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. *In re Dreyfus*, 22 CCPA (Patents) 830, 73 F.2d 931, 24 USPQ 52; *In re Waite et al.*, 35 CCPA (Patents) 1117, 168 F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. *In re Swenson et al.*, 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; *In re Scherl*, 33 CCPA (Patents) 1193, 156 F.2d 72, 70 USPQ 204. However, even though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable

Art Unit: 3748

if the modification was within the capabilities of one skilled in the art. In re Sola, 22 CCPA (Patents) 1313, 77 F.2d 627, 25 USPQ 433; In re Normann et al., 32 CCPA (Patents) 1248, 150 F.2d 627, 66 USPQ 308; In re Irmischer, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe.

Regarding claim 3, Abe discloses all the claimed limitation as discussed above except that that the fuel vaporizing device further comprises a water injector which supplies moisture to the air-fuel mixture in the fuel vaporizer.

However, Abe disclose an additional hydrogen rich gas supply device during steady state of the fuel reformer system having a water injector (22), which supplies moisture to the air-fuel mixture in the fuel vaporizer (17). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a water injector which supplies moisture to the air-fuel mixture in the fuel vaporizer of Abe system.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents:

Kasahara et al. (Pat. No. 6887603), Matoba (Pat. No. 6955860), Tachihara et al. (Pat. No. 6905327), and Kotani et al. (Pat. No. 6699609) all disclose an exhaust gas purification for use with an internal combustion engine.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (571) 272-4865. The examiner can normally be reached on Monday-Friday from 8:00 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (571) 272-4859. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BT
February 06, 2006



Binh Q. Tran
Patent Examiner
Art Unit 3748